

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference 303148WO/PRS | FOR FURTHER ACTION See Form PCT/IPEA/416 | |
| International application No. PCT/IB2004/001360 | International filing date (day/month/year) 23-03-2004 | Priority date (day/month/year) 24-03-2003 |
| International Patent Classification (IPC) or national classification and IPC H04Q 7/39, G01S 5/00 | | |
| Applicant Nokia Corporation et al | | |

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| 1. | This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. |
| 2. | This REPORT consists of a total of <u> 3 </u> sheets, including this cover sheet. |
| 3. | This report is also accompanied by ANNEXES, comprising: <div style="margin-left: 20px;"> a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u> 6 </u> sheets, as follows: <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. </div> </div> <div style="margin-left: 20px;"> b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions). </div> |
| 4. | This report contains indications relating to the following items: <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application </div> |

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|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Date of submission of the demand 19-10-2004 | Date of completion of this report 22-06-2005 |
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/IB2004/001360

Box No. 1 Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages 1-3, 7-18 as originally filed/furnished

pages* 4-6 received by this Authority on 2004-12-06

pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* 19-21 received by this Authority on 2004-12-06

pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-7 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing (specify): _____
☐ any table(s) related to the sequence listing (specify): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing (specify): _____
☐ any table(s) related to the sequence listing (specify): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/IB2004/001360

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|--------|-------------|-----|
| Novelty (N) | Claims | <u>1-14</u> | YES |
| | Claims | | NO |
| Inventive step (IS) | Claims | <u>1-14</u> | YES |
| | Claims | | NO |
| Industrial applicability (IA) | Claims | <u>1-14</u> | YES |
| | Claims | | NO |

2. Citations and explanations (Rule 70.7)

The claimed invention address the problem of routing emergency calls in a fast manner, while still providing location information with high accuracy.

Documents cited in the International Search Report:

D1: WO 9927716 A1
D2: US 6 128 481 A
D3: US 6 167 266 A

The cited documents represent the general state of the art.

The invention defined in claims 1-14 is not disclosed by any of these documents.

The cited prior art does not give any indication that would lead a person skilled in the art to the method which is claimed in claims 1-4, the communication system claimed in claims 5 and 6 or the network claimed in claims 7-14. None of the cited documents do suggest that a more accurate position estimate is determined after an interrupted call establishment has been resumed. The claimed invention thereby provides a position estimate with improved accuracy to a chosen answering point.

Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-14 is novel and is considered to involve an inventive step. The invention is industrially applicable.

IC20 Rec'd PCT/PTO 23 SEP 2009

However, this solution is not optimised in situations in which there are two or more PSAP service areas that overlap with the coverage of a single cell, and the problem becomes even more acute when the cell's are setup to have large coverage areas.

The present invention is related to allowing emergency calls to be routed based on geographical position within a cell.

Therefore there is a need for an improved manner of routing emergency calls based on the geographical location.

Summary of the Invention

It is an aim of embodiments of the present invention to address one or more of these problems using existing functionality.

According to one aspect there is provided a method for establishing an emergency call between a user equipment within a radio coverage area and one of at least two points able to answer the call, the method comprising: receiving an emergency call request; determining a first estimate of the position of said user equipment within said coverage area; interrupting said call establishment by triggering a control point; and using the control point to select, based on said first position estimate, which one of said at least two answering points the call is to be established with and when an at least one answering point has been selected, resuming said call establishment and determining a second more accurate position estimate and sending the second position estimate to the selected answering point.

Preferably non-call associated signalling is used wherein messages used to select the at least one of the two answering points during call establishment are separate from the messages used for the established call itself.

Preferably said selecting is done using the control point to translate the first position estimate which is a geographical position into a routing number of the selected answering point.

Preferably the first position estimate is determined by using an identifier of said radio coverage area and timing advance information.

According to a second aspect of the invention there is provided a communications system for establishing an emergency call between a user equipment and an emergency call processing centre, the system being configured to establish the call according to a method as set out above.

According to a third aspect of the invention there is provided a communications network for establishing an emergency call between a user equipment within a radio coverage area and one of at least two points able to answer the call, the network comprising: a base controller for controlling a base transceiver that provides said radio coverage area; a switching centre for receiving an emergency call request; a location centre for determining a first estimate of the position of said user equipment within said coverage area; and a control point for selecting which of said at least two answering points the call is established with based on said first position estimate and wherein said call establishment is interrupted by triggering the control point and when said at least one answering point has been selected, said switching centre resumes said call establishment and a second more accurate position estimate is determined and sent to the selected answering point.

Preferably the switching centre comprises means for identifying events during the call establishment.

Preferably said identifying means is arranged to identify the event when the first estimated position has been determined, and when said event is identified said control point is triggered and said call establishment is interrupted.

Preferably the at least two answering points are emergency call processing centres.

Preferably the control point is a GSM service control point.

Preferably the network further comprising a gateway location centre for providing an interface between said network and said at least two answering points.

Preferably the control point comprises a coordinate routing database for mapping a geographical position of said first position estimate into a routing number of said selected answering point.

Preferably the location centre is located within said base controller. Alternatively, the location centre may be located separate from said base controller.

Brief Description of Drawings

For a better understanding of the present invention and to show how the same may be carried into effect, reference will now be made by way of example to the accompanying drawings in which:

Figure 1 shows the generic LCS logical architecture;

Figure 2 shows the system level of the LCS arrangement for GSM and UMTS radio access networks;

Figure 3 shows a network reference model for supporting emergency services;

Figure 4 shows overlapping PSAP regions and radio cell coverage according to an embodiment of the present invention;

Figure 5 shows a flow-chart of a known NCAS method of using the initial position for routing and processing the call;

Figure 6 shows a flow chart of an alternative embodiment of the present invention; and

Figure 7 shows a flow chart describing in more detail some of the steps of Figure 6.

CLAIMS:

1. A method for establishing an emergency call between a user equipment within a radio coverage area and one of at least two points able to answer the call, the method comprising:

receiving an emergency call request;

determining a first estimate of the position of said user equipment within said coverage area;

interrupting said call establishment by triggering a control point;

using the control point to select, based on said first position estimate, which one of said at least two answering points the call is to be established with; and

when an at least one answering point has been selected, resuming said call establishment and determining a second more accurate position estimate and sending the second position estimate to the selected answering point.

2. The method according to claim 1, wherein non-call associated signalling is used wherein messages used to select the at least one of the two answering points during call establishment are separate from the messages used for the established call itself.

3. The method according to any preceding claim, wherein said selecting is done using the control point to translate the first position estimate, which is a geographical position into a routing number of the selected answering point.

4. The method according to any preceding claim, wherein the first position estimate is determined by using an identifier of said radio coverage area and timing advance information.

5. A communications system for establishing an emergency call between a user equipment and an emergency call processing centre, the system being configured to establish the call according to the method of claim 1.

6. A communications network for establishing an emergency call between a user equipment within a radio coverage area and one of at least two points able to answer the call, the network comprising:

a base controller for controlling a base transceiver that provides said radio coverage area;

a switching centre for receiving an emergency call request;

a location centre for determining a first estimate of the position of said user equipment within said coverage area; and

a control point for selecting which of said at least two answering points the call is established with based on said first position estimate and wherein said call establishment is interrupted by triggering the control point and when said at least one answering point has been selected, said switching centre resumes said call establishment and a second more accurate position estimate is determined and sent to the selected answering point.

7. The network according to claim 6, wherein the switching centre comprises means for identifying events during the call establishment.

8. The network according to claim 7, wherein said identifying means is arranged to identify the event when the first estimated position has been determined, and when said event is identified said control point is triggered and said call establishment is interrupted.

9. The network according to any of claims 6 to 8, wherein the at least two answering points are emergency call processing centres.

10. The network according to any of claims 6 to 9, wherein the control point is a GSM service control point.

11. The network according to any of claims 6 to 10, wherein the network further comprising a gateway location centre for providing an interface between said network and said at least two answering points.
12. The network according to any of claims 6 to 11, wherein the control point comprises a coordinate routing database for mapping a geographical position of said first position estimate into a routing number of said selected answering point.
13. The network according to any of claims 6 to 12, wherein the location centre is located within said base controller.
14. The network according to any of claims 6 to 12, where in the location centre is located separate from said base controller.